

UNPUBLISHED PRELIMINARY DATA

Semi-Annual Status Report

June 1, 1964 to November 30, 1964
SC/NsG-137/24-05-003

N65-82953

*See file
Nasa CR 57424*

Activities carried on during the subject reporting period were of two types: (1) preparation of reports on previously-executed research, (2) initiation of new research on the reflectance characteristics of surfaces.

The aforementioned reports are herewith enclosed. The first, entitled "Biangular Reflectance Characteristics of an Electric Nonconductor as a Function of Wavelength and Surface Roughness," describes a detailed investigation of the directional reflection properties of magnesium oxide. This paper has been accepted for publication in the Journal of Heat Transfer. The second report is entitled "Radiant Emission Characteristics of Nonisothermal Cavities." It is concerned with the effect of an axial temperature variation on the radiant energy streaming from the mouth of a circular-cylindrical cavity. Additional reprints of the aforementioned paper are being prepared; these will be forwarded to your office as soon as they become available.

For the continuation of the experimental program on the reflectance characteristics of surfaces, it was decided that aluminum would be of both fundamental and applied interest. To this end, ultra-high purity aluminum bar stock (99.993 percent pure) was obtained and 6 test specimens were fabricated. After polishing these specimens, it was found that the intrinsic softness of the material precluded homogeneous, isotropic surfaces. A second high-purity bar (99.990 percent pure) was sectioned along a different plane with a view to fabricating another set of test specimens. However, these displayed anomalous reflectance characteristics. These same specimens were then repolished and reground with a different technique, but the anomalous behavior persisted.

Subsequent coating with a vacuum-deposited aluminum film showed little change in the reflectance characteristics. Most recently, a standard aluminum alloy (2024) has been utilized for test specimens. The specimen surfaces have been polished and ground, and then coated with a pure aluminum film. These specimens are now awaiting investigation.

In the meanwhile, consideration has been given to the off-specular peaks in the directional reflectance distributions of dielectric materials. Such peaks were noted in the aforementioned investigation of magnesium oxide specimens. A test program has been formulated. Results should be available by the completion of the next reporting period.